

CLAIMS:

1. A flexible sheet material having a Frazier permeability of at least about $70 \text{ m}^3/\text{min-m}^2$ and an unsupported hydrostatic head of at least about 15 cm.
2. The flexible sheet material according to Claim 1 wherein the hydrostatic head is at least about 20 cm.
3. A flexible sheet material having a Frazier permeability of at least about $28 \text{ m}^3/\text{min-m}^2$ and an unsupported hydrostatic head of at least about 30 cm.
4. A flexible sheet material having a Frazier permeability of at least about $15 \text{ m}^3/\text{min-m}^2$ and a hydrostatic head of at least about 40 cm.
5. A flexible sheet material having a Frazier permeability of at least about $1 \text{ m}^3/\text{min-m}^2$ and a hydrostatic head of at least about 80 cm.
6. A flexible sheet material comprised of meltspun nonwoven fibers having an average length of at least about 4 cm and wherein a substantial majority of the fibers have a cross section of less than about 70 square microns and the average fiber strength is at least 275 N/mm^2 .
7. A flexible sheet material formed of nonwoven fibers where in the sheet has a basis weight of at least about 13 g/m^2 up to about 75 g/m^2 , and wherein substantially all of the fibers are meltspun fibers, a substantial majority by weight of the fibers have a cross section of less than about 90 square microns, and wherein the sheet material has a Frazier permeability is at least about $1 \text{ m}^3/\text{min-m}^2$ and a hydrostatic head of at least about 25 cm.
8. The sheet material according to Claim 7 wherein the hydrostatic head is at least 30 cm.

9. The sheet material according to Claim 7 wherein the hydrostatic head is at least 40 cm.
10. The sheet material according to any one of Claims 5, 6, and 7 wherein the Frazier permeability is at least about $5 \text{ m}^3/\text{min}\cdot\text{m}^2$.
- 5 11. The sheet material according to any one of Claims 5 and 7 wherein the Frazier permeability is at least about $10 \text{ m}^3/\text{min}\cdot\text{m}^2$.
12. The sheet material according to any one of Claims 5 and 7 wherein the Frazier permeability is at least $15 \text{ m}^3/\text{min}\cdot\text{m}^2$.
- 10 13. The sheet material according to any one of Claims 4, 5 and 7 wherein the Frazier permeability is at least $25 \text{ m}^3/\text{min}\cdot\text{m}^2$.
14. The sheet material according to any one of Claims 3, 4, 5 and 7 wherein the Frazier permeability is at least $35 \text{ m}^3/\text{min}\cdot\text{m}^2$.
15. The sheet material according to any one of Claims 3, 4 and 7 wherein the Frazier permeability is at least about $45 \text{ m}^3/\text{min}\cdot\text{m}^2$.
- 15 16. The sheet material according to any one of Claims 3, 4, and 7 wherein the hydrostatic head is at least 50 cm.
17. The sheet material according to any one of Claims 3, 4, and 7 wherein the hydrostatic head is at least 60 cm.
- 20 18. The sheet material according to any one of Claims 1, 3, 4, and 5 wherein the sheet material is comprised of fibers wherein the average fiber size is less than about $90 \mu\text{m}^2$.
19. The sheet material according to any one of Claims 1, 3, 4, 5, and 7 wherein the sheet material is comprised of fibers wherein the average fiber size is less than about $75 \mu\text{m}^2$.
- 25 20. The sheet material according to any one of Claims 1, 3, 4, 5, 6 and 7 wherein the sheet material is comprised of fibers wherein the average fiber size is less than about $60 \mu\text{m}^2$.

21. The sheet material according to any one of Claims 1, 3, 4, 5, and 7 wherein the sheet material is comprised of fibers having a minimum fiber strength of about 275 newtons per square millimeter.

22. The sheet material according to any one of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet has a grab tensile strength of at least about 1 N/g/m².

23. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet material is comprised of fibers and wherein the majority of fibers have a boil off shrinkage of less than ten percent.

24. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet material is comprised of fibers which are split fibers from larger conjugate melt spun fibers.

25. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet material is comprised of fibers, and at least a portion of the fibers are formed of at least two separate component polymers.

26. The sheet material according to Claim 25 wherein one of said components overlies the other in a sheath-core arrangement.

27. The sheet material according to Claim 26 wherein the sheath component of the fibers includes at least one additive blended into the polymer.

28. The sheet material according to Claim 27 wherein the additive is a hydrophobic additive to repel liquids.

29. The sheet material according to Claim 28 wherein the additive is a fluorocarbon.

30. The sheet material according to Claim 27 wherein the additive is a stabilizer.

31. The sheet material according to Claim 30 wherein the stabilizer is a stabilizing agent for ultraviolet energy exposure.

32. The sheet material according to Claim 28 wherein the additive is a wetting agent to cause mechanical absorption of liquids into the fabric.

33. The sheet material according to Claim 28 wherein the additive provides a color to the fibers and fabric.

34. The sheet material according to Claim 28 wherein the additive reduces the buildup of static electricity in the fabric.

35. The sheet material according to Claim 28 wherein the additive is an antimicrobial agent.

36. The sheet material according to Claim 27 wherein the polymer comprising the sheath has a lower melting temperature than the polymer comprising the core.

37. The sheet material according to Claim 27 wherein the polymer comprising the sheath does not substantially degrade from exposure to radiation sterilization processing.

38. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet is comprised of fibers and a first portion of the fibers is comprised of a first polymer and a second portion is formed of a second polymer, wherein one of said first and second polymers melts at a lower temperature than the other to facilitate thermal bonding.

39. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet is comprised of fibers and the fibers comprise polyester polymer.

40. The sheet material according to Claim 39 wherein the fibers are comprised of polyethylene terephthalate polymer.

41. The sheet material according to Claim 39 wherein the fibers are comprised of polypropylene terephthalate polymer.

42. The sheet material according to Claim 39 wherein the fibers are comprised of polybutylene terephthalate polymer.

5 43. The sheet material according to Claim 39 wherein the fibers are comprised of polyester with an additional polymer blended with the polyester polymer.

10 44. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet is comprised of fibers and the fibers comprise nylon polymer.

45. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet is comprised of fibers and the fibers comprise polyethylene polymer.

15 46. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet is comprised of fibers and the fibers comprise polypropylene polymer.

47. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet material is comprised of fibers and the fibers are comprised of elastomeric polymer.

20 48. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet is comprised of fibers and the fibers comprise a blend of different polymers.

25 49. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet is comprised of fibers and the fibers comprise at least one additive blended into the polymer.

50. The sheet material according to Claim 49 wherein the additive is a hydrophobic additive to repel liquids.

51. The sheet material according to Claim 49 wherein the additive is a fluorocarbon.

52. The sheet material according to Claim 49 wherein the additive is a stabilizer.

5 53. The sheet material according to Claim 52 wherein the stabilizer is a stabilizing agent for ultraviolet energy exposure.

54. The sheet material according to Claim 49 wherein the additive is a wetting agent to increase mechanical absorption of liquids into the fabric.

10 55. The sheet material according to Claim 49 wherein the additive provides a color to the fibers and fabric.

56. The sheet material according to Claim 49 wherein the additive reduces the buildup of static electricity in the fabric.

15 57. The sheet material according to Claim 49 wherein the additive is an antimicrobial agent.

58. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet material is formed of fibers with a repellent finish applied thereon.

20 59. The sheet material according to Claim 58 wherein said repellent finish comprises a fluorocarbon.

60. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet material is comprised of melt extruded generally continuous filament polymer fibers.

25 61. The sheet material according to Claim 60 wherein the fibers are ultrasonically bonded together.

62. The sheet material according to Claim 60 wherein the fibers which are thermally bonded together.

63. The sheet material according to Claim 60 wherein the sheet material is comprised of fibers which are adhesively bonded together.

5 64. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the material has a cross sectional void percentage of at least about 85 percent.

65. The sheet material according to Claim 64 wherein the material has a cross sectional void percentage of at least about 89 percent.

10 66. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the polymer does not substantially degrade due to exposure to radiation sterilization processing.

15 67. The sheet material according to Claim 66 wherein the polymer does not substantially degrade due to exposure to gamma radiation.

68. The sheet material according to Claim 66 wherein the polymer does not substantially degrade due to exposure to e-beam radiation.

20 69. The sheet material according to any of Claims 1, 3, 4, 5, 6, and 7 wherein the sheet material is comprised of layers of fibers forming a nonwoven sheet and wherein all of the layers are direct laid meltspun generally continuous fibers.

25 70. The sheet material according to any of Claims 1, 3, 4, 5, and 6 wherein the basis weight is greater than 13 grams per square meter and less than 100 grams per square meter.

71. The sheet material according to Claim 5 wherein the basis weight is greater than 65 grams per square meter and less than 250 grams per square meter.

72. A radiation sterilization stable sheath-core bi-component fiber suited for making a thermally bonded nonwoven fabric wherein the core polymer is polyethylene terephthalate and the sheath fiber is polypropylene terephthalate.

5 73. The radiation sterilization stable sheath-core bi-component fiber according to Claim 72 wherein the sheath polymer includes pigment blended therein and the core polymer is generally free of pigment.

10 74. The radiation sterilization stable sheath-core bi-component fiber according to Claim 73 wherein the sheath polymer further includes a fluorocarbon blended therein.

75. The radiation sterilization stable sheath-core bi-component fiber according to Claim 73 wherein the average cross sectional area of the fiber is less than 90 square microns.

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